

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior listing of claims for the present application.

1. (currently amended) A capacitor for a semiconductor device, said capacitor comprising:

a bottom conducting layer;

a dielectric layer formed over said bottom conducting layer; and

at least one top conducting layer formed over said dielectric layer, wherein at least an uppermost portion of the top conducting layer is an oxidized gas annealed top conducting layer formed over said dielectric layer, said top conducting layer comprising an oxygen permeable material.

2. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a material selected from the noble metal group.

3. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a metal.

4. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a metal alloy.

5. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a conducting metal oxide.

6. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a metal nitride.

7. (original) The capacitor of claim 1, wherein said bottom conducting layer is formed of a material selected from the group consisting of: Platinum (Pt), Platinum Rhodium (PtRh), Platinum Iridium (PtIr), Ruthenium, Ruthenium Oxide (RuO₂), Rhodium Oxide (RhO₂), Chromium Oxide (CrO₂), Molybdenum Oxide (MoO₂), Rhodium Oxide (RhO₃), Iridium Oxide (IrO₂), Titanium Oxides (TiO₁ or TiO₂), Vanadium Oxides (VO₁ or VO₂), Niobium Oxides (NbO₁ or NbO₂), and Tungsten Nitride (WN_x, WN, or W₂N).

8. (original) The capacitor of claim 7, wherein said bottom conducting layer is formed of a material selected from the group consisting of: Platinum (Pt), Platinum Rhodium (PtRh), Platinum Iridium (PtIr), and Tungsten Nitride (WN_x, WN, or W₂N).

9. (original) The capacitor of claim 1, wherein said bottom conducting layer is placed on top of an oxygen barrier.

10. (original) The capacitor of claim 1, wherein said dielectric layer is a dielectric metal oxide layer.

11. (original) The capacitor of claim 1, wherein said dielectric layer has a dielectric constant between 7 and 300.

12. (original) The capacitor of claim 1, wherein said dielectric layer is formed of a material selected from the group consisting of: Tantalum Oxide, Tantalum Pentoxide (Ta₂O₅), Barium Strontium Titanate (BST), Aluminum Oxide (Al₂O₃), Zirconium Oxide (ZrO₂), Praseodymium Oxide (PrO₂), Tungsten Oxide (WO₃), Niobium Pentoxide

(Nb₂O₅), Strontium Bismuth Tantalate (BST), Hafnium Oxide (HfO₂), Hafnium Silicate, Lanthanum Oxide (La₂O₃), Yttrium Oxide (Y₂O₃) and Zirconium Silicate.

13. (original) The capacitor of claim 12, wherein said dielectric layer is formed of a material selected from the group consisting of: Tantalum Oxide, Tantalum Pentoxide (Ta₂O₅), Barium Strontium Titanate (BST), Strontium Bismuth Tantalate (SBT), Aluminum Oxide (Al₂O₃), Zirconium Oxide (ZrO₂) and Hafnium Oxide (HfO₂).

14. (original) The capacitor of claim 13, wherein said dielectric layer is Tantalum Oxide and is amorphous or crystalline.

15. (original) The capacitor of claim 1, wherein said top conducting layer is formed of a material selected from the noble metal group.

16. (original) The capacitor of claim 1, wherein said top conducting layer is formed of a non-oxidizing metal permeable to oxygen.

17. (original) The capacitor of claim 1, wherein said top conducting layer is formed of a conducting metal oxide.

18. (original) The capacitor of claim 1, wherein said top conducting layer is formed of a material selected from the group consisting of: Platinum (Pt), Platinum Rhodium (PtRh), Platinum Iridium (PtIr), Ruthenium, Ruthenium Oxide (RuO₂), Rhodium Oxide (RhO₂), Chromium Oxide (CrO₂), Molybdenum Oxide (MoO₂), Rhodium Oxide (ReO₃), Iridium Oxide (IrO₂), Titanium Oxides (TiO₁ or TiO₂), Vanadium Oxides (VO₁ or VO₂), and Niobium Oxides (NbO₁ or NbO₂).

19. (original) The capacitor of claim 18, wherein said top conducting layer is formed of a material selected from the group consisting of: Platinum (Pt), Platinum Rhodium (PtRh), and Platinum Iridium (PtIr).

20. (original) The capacitor of claim 1, wherein said bottom and top conducting layers are formed of a material selected from the group consisting of: Platinum, Platinum Rhodium (PtRh), or Platinum Iridium (PtIr) and said dielectric layer is a layer of Tantalum Oxide.

21. (original) The capacitor of claim 1, wherein said bottom and top conducting layers are formed of a material selected from the group consisting of: Platinum, Platinum Rhodium (PtRh), or Platinum Iridium (PtIr) and said dielectric layer is a layer of Barium Strontium Titanate (BST).

22. (original) The capacitor of claim 1, wherein said top conducting layer is formed of a material selected from the group consisting of: Platinum, Platinum Rhodium (PtRh), or Platinum Iridium (PtIr) and said bottom conducting layer is a layer of Tungsten Nitride (WN_x, WN, or W₂N) layer and said dielectric layer is a layer of Aluminum Oxide (Al₂O₃).

23. (original) The capacitor of claim 1, wherein said top conducting layer is annealed with an oxygen compound.

24. (original) The capacitor of claim 23, wherein said oxygen annealed layer is one annealed in the presence of a material selected from the group consisting of: Oxygen (O₂), Ozone (O₃), Nitrous Oxide (N₂O), Nitric Oxide (NO), and water vapor (H₂O).

25. (original) The capacitor of claim 23, wherein said oxygen annealed layer is one annealed in the presence of a gas mixture containing at least one element selected from the group consisting: Oxygen (O₂), Ozone (O₃), Nitrous Oxide (N₂O), Nitric Oxide (NO), and water vapor (H₂O).

26. (previously presented) The capacitor of claim 23, wherein said annealed top conducting layer is a plasma enhanced annealed top conducting layer.

27. (previously presented) The capacitor of claim 23, wherein said annealed top conducting layer is a remote plasma enhanced annealed top conducting layer.

28. (previously presented) The capacitor of claim 23, wherein said annealed top conducting layer is an ultraviolet light enhanced annealed top conducting layer.

29. (original) The capacitor of claim 1, wherein said capacitor is a stacked capacitor.

30. (original) The capacitor of claim 1, wherein further comprising an access transistor connected to said capacitor.

31. (original) The capacitor of claim 1, wherein said capacitor forms part of a dynamic random access memory cell.

Claims 32-98 (canceled).

99. (New) A capacitor for a semiconductor device, said capacitor comprising:

a bottom electrode;

a dielectric layer formed over said bottom electrode; and

a top electrode comprising at least one conducting layer formed over said dielectric layer, wherein at least an uppermost portion of said conducting layer is an oxidized gas annealed layer.